

# Lummi Indian Reservation Wind Energy Development Feasibility Assessment



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U.S. Department of Energy Tribal Energy Program Review  
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# Purpose Statement

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- The purpose of this presentation is to:
    - Provide summary information about the Lummi Nation;
    - Describe the Lummi Indian Reservation Wind Energy Development Feasibility Assessment Project;
    - Provide an update on the project status; and
    - Summarize lessons learned (so far...)
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# Lummi Nation Overview

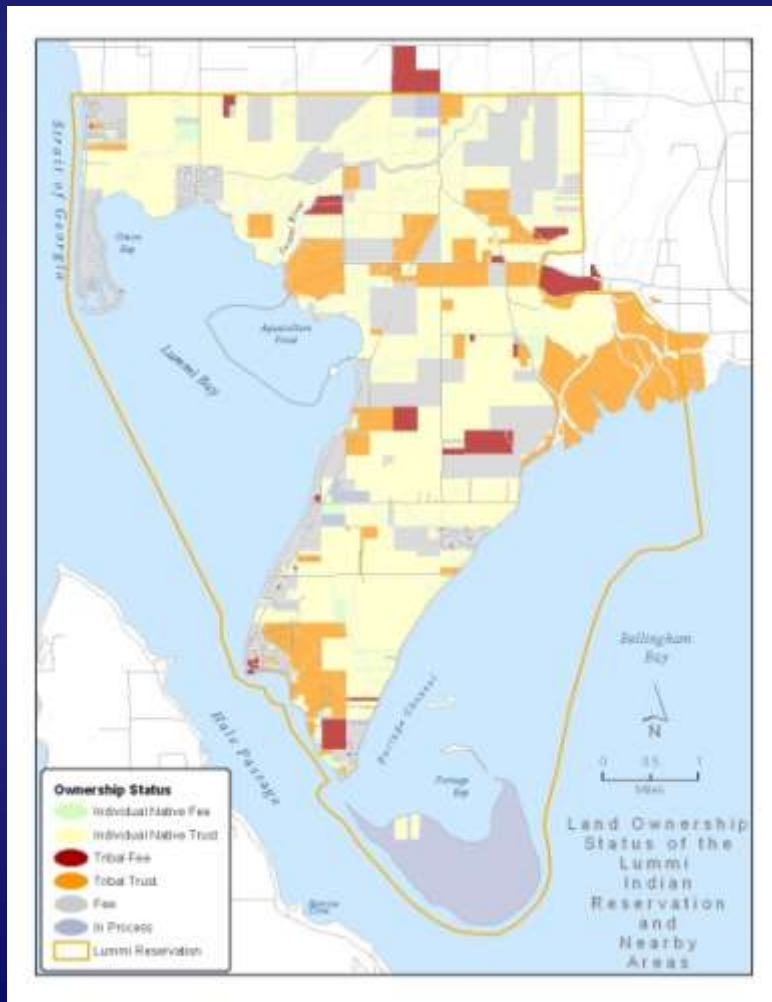
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# The Lummi Reservation Today



- The Lummi Reservation is comprised of approximately 12,500 acres of upland and about 7,000 acres of tidelands.
- The Lummi Nation and/or enrolled members own about 75 percent of uplands.
- The Lummi Nation owns 100 percent of the tidelands.

# Lummi is a Fishing Tribe





# Lummi is a Fishing Tribe





# The Lummi People



- There are approx. 4,200 enrolled Lummi tribal members.
- Approximately 2,400 tribal members live on Reservation – the remainder live in the region or elsewhere.





# The Lummi Government

- The Lummi Nation is a sovereign government and has been since time immemorial.
- The Lummi Nation was one of ten tribes nationally that initiated the Self-Government Demonstration Project.
- The Lummi Nation is governed by an elected 11 member Lummi Indian Business Council, various commissions, and the General Council (all voting enrolled members).
- There are numerous departments (e.g., Cultural, Economic Development, Police, Education, Health, Planning, Natural Resources) and an independent Tribal Court system.
- Currently a tribal water and sewer district but no tribal electric/power utility.



# Governmental Actions



Constructed a \$24 million K-12 school that was completed during 2004.

- Promote education and opportunities for tribal youth (investing in Human Resources).
- Establish a regulatory framework to protect public health and welfare, natural resources, cultural resources, and to support economic development.
- Currently constructing a \$28 million tribal administrative building that will include a geothermal heat pump.
- See website ([www.lummi-nsn.gov](http://www.lummi-nsn.gov)) for more information, Lummi Code of Laws, and the Lummi Nation Atlas.



# Governmental Actions



- Create family wage jobs
  - Lummi government and enterprises combined are the 3<sup>rd</sup> largest employer in the Whatcom County area.
  - Tribal enterprises include the Silver Reef Hotel, Casino, & Spa; gas stations; mini-marts; Northwest Indian College; K-12 School.
- Seek new business opportunities to continue economic diversification and to increase self-reliance and economic independence.



# Lummi Indian Reservation Wind Energy Development Feasibility Assessment Project

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# Project Objective

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- Provide the information needed by the Lummi tribal council to make a knowledge-based determination if a wind generation project on the Reservation provides enough economic, environmental, cultural, and social benefits to justify the cost of development.
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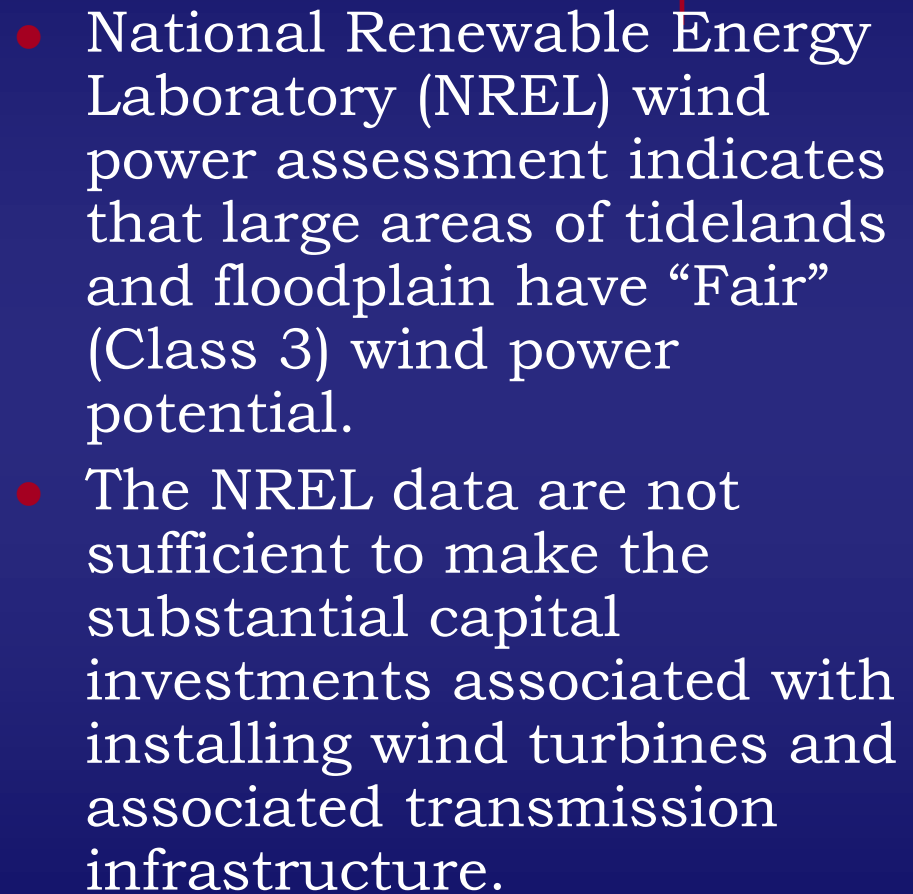
# Project Objective

- Answer the following three key questions:
  - Is there enough wind to justify further pursuit of developing wind energy generation capabilities on the Reservation?
  - What are the likely wildlife impacts associated with installing one or more wind turbines and what are practicable mitigation measures if there are unavoidable impacts?
  - What are the likely noise impacts associated with installing one or more wind turbines and what are practicable mitigation measures if there are unavoidable impacts?
- Other impacts will be evaluated during the TEPA/NEPA compliance if a determination is made to develop a wind generation project.



# Project Participants

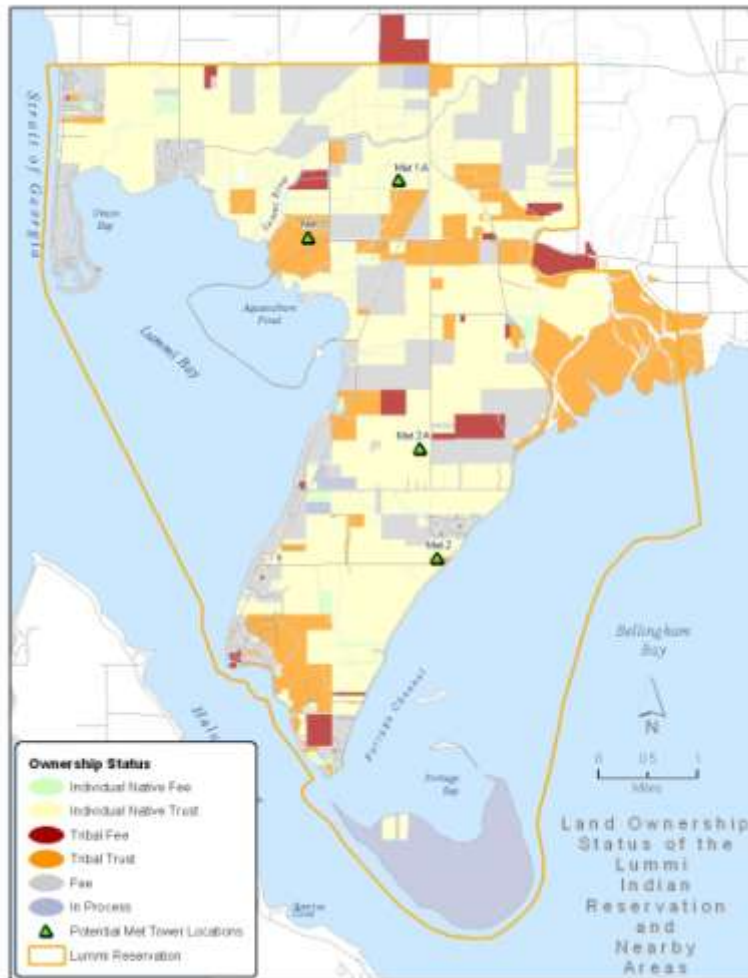
- Lummi Natural Resources Department staff members are assigned as the Project Manager and project support.
- Due to short duration and specialized expertise, consultants have been contracted to conduct the analyses needed to answer the three primary questions.
  - DNV Renewables (USA) – Wind Assessment
  - Hamer Environmental – Wildlife Assessment
  - j. c. brennan & associates – Noise Assessment





# Project Components

- Wind Energy Assessment:
  - Advertise and select a qualified contractor (completed)
  - Jointly conduct a wind monitoring equipment siting survey (completed)
  - Obtain tribal land use permits for anemometer installations (pending)





# Project Components



- Wind Energy Assessment (continued):
  - Purchase/borrow and install two continuously recording, 60-meter tall anemometers stations equipped with modems to allow weekly downloads of data – operate stations for one year.
  - If we can secure additional funding, rent a SODAR unit to measure wind 200 meters above the ground, calibrate at the anemometer sites, measure wind at two additional sites, correlate results.





# Project Components

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- Wind Energy Assessment (continued):
    - Contractor to correlate wind data collected at the anemometer and SODAR sites with longer term sites at the Bellingham Airport and other nearby sites (e.g., aluminum smelter, oil refineries) to estimate the long-term wind conditions.
    - Contractor to analyze the collected and correlated wind data using wind modeling software.
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# Project Components

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- Related Assessments:
    - A contractor to complete an assessment of the impacts of one or more wind turbines on Reservation wildlife – primarily bats and marbled murrelets but others water fowl also.
    - A contractor to complete an assessment of the noise impacts of one or more wind turbines on surrounding landowners and Reservation businesses and help us develop a noise ordinance.
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# Project Components

- Final Report prepared by the contractor(s) will include:
  - A wind map for the Reservation based on the collected and correlated wind data.
  - A recommended wind turbine for the Reservation conditions that considers the results of the wildlife and noise impacts assessments.
  - An economic analysis that includes estimated capital costs, maintenance costs, variable discount rates plotted against the estimated value of energy in a pro-forma analysis over a 20-year live cycle.



# Project Components

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- Final Report will also include:
    - An analysis of a single turbine at each site and a wind farm layout using the Wind Farmer software package and property boundary constraints to estimate wind farm size and potential energy production.
    - An analysis of the tribal load and export market.
  - LNR Project staff and contractor(s) will present results and recommendations to Lummi policy makers and to the tribal council.
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# Project Schedule/Status

## Proposed Schedule

- Projected Start Date:  
October 1, 2009
- Contractor(s) Selected  
within 3 months.
- Conduct siting survey  
and install equipment  
within 3 months of  
Contractor awards

## Actual Schedule/Status

- Grant Agreement  
Executed June 2, 2010
- Contracts executed on  
September 29, 2010.
- Siting survey  
conducted Oct. 7,  
2010, equipment  
installation is targeted  
for no later than  
12/31/10





# Project Schedule/Status

## Proposed Schedule

- Collect wind data for 12 months following equipment installation
- Conduct wildlife and noise impact assessment during wind data collection
- Complete final report within 6 months after wind data collection effort

## Actual Schedule/Status

- On-track to start wind data collection by December 31, 2010
- Project team meeting on Oct. 7, 2010 to coordinate efforts; on-track
- On-track to complete study by June 30, 2012.



# Lessons Learned (so far...)

- Either get more than one price quote prior to submitting your grant application or seek representative costs from other tribes that have conducted wind energy feasibility assessments.
  - The cost of the wind energy assessment element of our grant application was based on an estimate from a single local vendor.
    - Local vendor estimated \$128,000 for “everything”.
    - Selected contractor from nearby Seattle estimated \$179,000.
  - Cost differences due to a number of factors:
    - Local vendor did not include costs for “everything”.
    - Selected contractor has more expensive staff costs and also accounted for inflation over the multi-year project.
    - Contractor selected because they have more experience, are a known and reputable company in the industry, and have conducted “due diligence” studies for banks that finance wind farm projects.



# Lessons Learned (so far...)

- Seek estimated costs from representative projects for other assessment elements:
  - Wildlife Impact Assessment budget is \$31,000, which is OK but \$50,000 would have resulted in additional field work.
- Budget for your staff costs.
  - Our initial grant application did not include tribal staff costs in an effort to keep the project cost down and have a more competitive grant application.
    - Conducting the procurement process (e.g., posting the RFP, responding to questions about the RFP, reviewing proposals, interviewing firms, negotiating contracts), meeting with contractors, conducting site visits, reviewing contractor products, participating in these Tribal Energy Program reviews all take time.
    - Fortunately we were able to amend our grant application in response to Department of Energy feedback and provide for a total of a 0.10 FTE over two years.



# Lessons Learned (so far...)

- NREL and the Tribal Energy Program have a lot of technical resources/support and helpful staff.
- Make useful contacts during the Tribal Energy Program Review and other workshops.
  - Representatives from the BIA met last November provided technical assistance this August in reviewing submitted proposals from contractors.
- Seek alternative funding for related efforts.
  - Obtained an EPA grant (General Assistance Program [GAP]) to develop a Strategic Energy Plan Technical Background Document during 2011.
- May need to get FAA approval for anemometers if near an airport.
- Ensure cell phone coverage for data logger downloads.

# Summary and Conclusion

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# Summary and Conclusion

- Lummi is a Fishing Tribe – economic diversification is a priority.
- This project will provide the information needed by the Lummi tribal council to make a knowledge-based determination if a wind generation project on the Reservation is feasible.
- Approximately two years are needed to select and contract consultants, collect the empirical wind data for one year, evaluate impacts to wildlife and landowners (noise) concurrently with the wind data collection, and complete the feasibility assessment.



# Summary and Conclusion

- Initial Recommendations Include:
  - Obtain more than one cost estimate for feasibility assessment costs prior to submitting grant application.
  - Utilize available technical and financial resources offered by the DOE Tribal Energy Program/NREL, BIA, and others.
  - Attend workshops sponsored by the Department of Energy Tribal Energy Program/NREL.
  - Develop a strategic energy plan – need one or more tribal policy makers to be renewable energy champions.
  - Select wind assessment contractors who have recognized expertise and have performed “due diligence” analyses of wind projects for banks that finance wind farm projects.
  - Select wildlife and noise contractors who have specialized expertise in evaluating wind energy projects – conduct analyses at the same time as the wind study.

# Thank You!



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